2024 Insect Report

Japanese Beetle
The invasive beetle remains contained, as UDAF continues eradication efforts.
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Emerald Ash Borer
Extensive trapping and enforcement of importation quarantines protect Utah's ash trees from this invasive pest.
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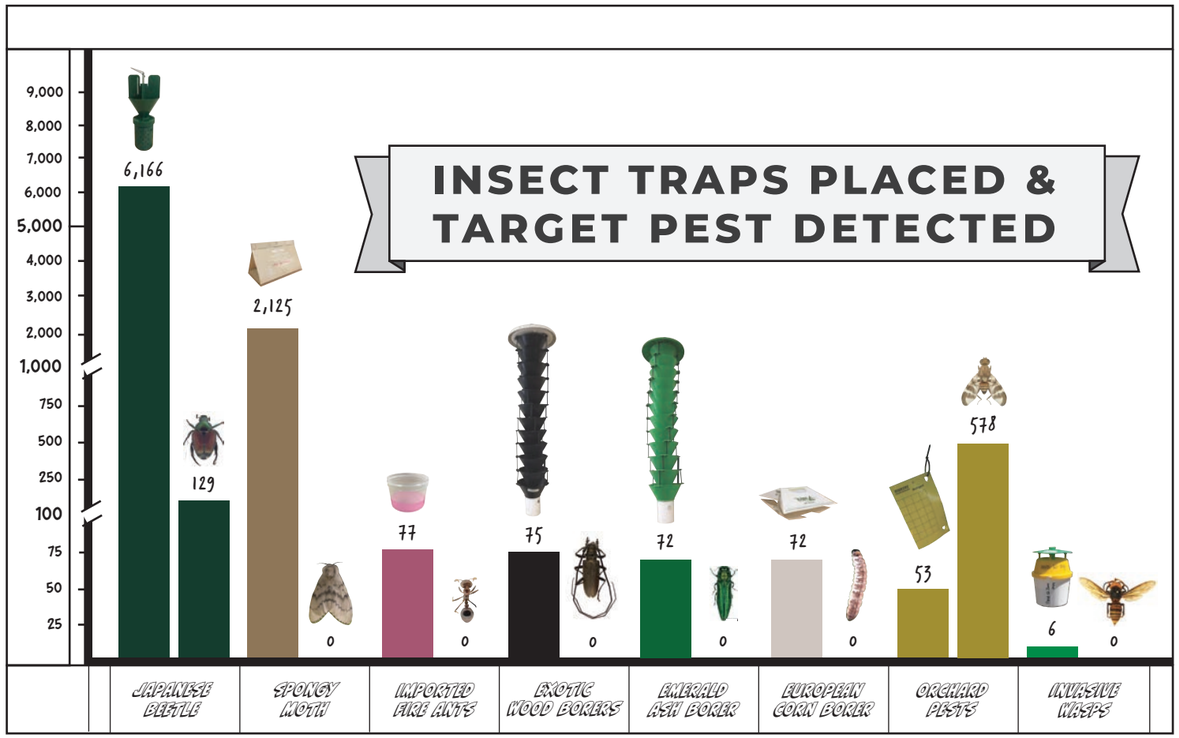
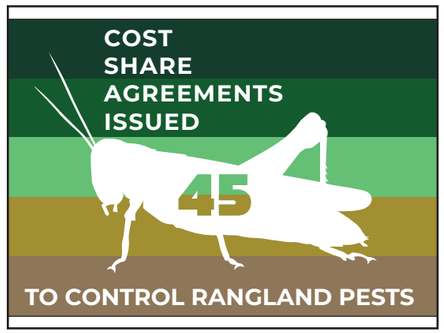
Utah Department of Agriculture & Food
Division of Plant Industry
April 2025

At a Glance Accomplishments





PROGRAM PARTNERS

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Mission Statement

The mission of the Utah Department of Agriculture and Food (UDAF) is to support the development of Utah's agriculture and food industries, serve as a steward of our natural resources, safeguard public health, protect consumers, and ensure a quality food supply.

The UDAF Plant Industry Division Insect Program is essential to the department's overall mission. The program prevents the introduction of devastating invasive insects and plant diseases, assists producers in the suppression of rangeland pests, and protects the health of managed pollinators.

These goals are achieved by three primary strategies:

Prevention and Protection

Invasive insects and plant diseases are transmitted in various ways, often unintentionally. State-directed quarantines and inspections serve as first line defense measures and can prevent the establishment of new maladies.

Early Detection and Rapid Response

Whether it is an emergent invasive pest, native rangeland insect outbreak, or regulated disease, the UDAF Insect Program vigilantly monitors for known agricultural threats and responds quickly to contain or eradicate these problems before they become widespread and unmanageable.

Best Practices

The program strives to follow best practices in all work performed. Staff utilize advanced technology and make decisions based on the best available science to ensure that activities are sensible, cost effective, and environmentally responsible.

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First Edition - April 2025

Regulatory Roundup

Plant Industry Compliance Specialists conduct inspections of agricultural commodities and are dispatched statewide to enforce the Insect Program's quarantines. Inspections take place at nurseries, retail stores, and other places where commodities regulated by UDAF are sold. In 2024, numerous violations were found, after which inspectors worked with producers and retailers to safely destroy or remove these contraband products from the state.

Online sales regulation

While UDAF has been regulating brick and mortar plant nurseries in Utah for decades, the number of online nurseries has grown steadily in recent years. In fact, the global online nursery market size was $11.4 billion in 2023 and is projected to keep rising. Once ordered, these regulated products often travel over state lines before entering Utah, providing ample opportunities for pests to hitchhike. To reduce the risk of pest introduction through these pathways, UDAF recently began monitoring online sales of regulated plants such as ash trees *Fraxinus spp.* and turf grass (various genera).

Across nine major online nursery retailers, 126 turfgrass products are now restricted from shipment and delivery to Utah customers from quarantined states (see UAC § R68-15). Similarly, 39 listings for ash trees and 10 listings for ash products (e.g., wood slabs with the bark attached) are also now in compliance (see UAC § R68-11). UDAF will continue to monitor for compliance in online sales of ash and turfgrass products as well as firewood and other regulated plants.

Firewood quarantine violations

Live insects and plant diseases can reside inside or on firewood; the transportation of firewood constitutes a major invasive organism pathway. As a result, in 2019, UDAF enacted the Utah Firewood Quarantine (see UAC § R68-23). The rule requires that firewood be heat treated prior to importation into the state so that exotic pests do not come with the commodity. In the years since enactment, the department has done extensive public outreach to educate both retailers and residents about the rules. To monitor for violations, Plant Industry Compliance Specialists inspect firewood anywhere it is sold in the state.

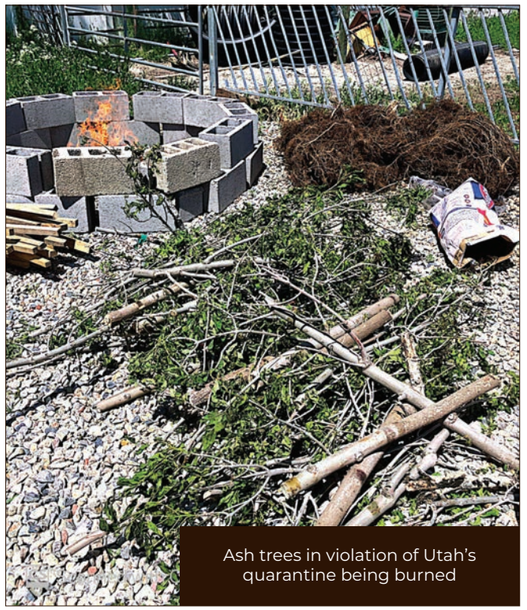
Unfortunately, numerous quarantine violations were found in 2024. A total of 86 stores across 14 counties were issued hold orders and 28 of those resulted in product being destroyed or ordered removed from the state. The UDAF Insect Program plans to include many of these violation sites as trapping locations in the 2025 Exotic Wood Borer Survey (see pages 31 -33) to monitor for invasive pest introductions that may have occurred.

Firewood on stop sale for violations of state quarantine rules

Japanese beetle quarantine violations

Utah has enforced a quarantine on the Japanese beetle (JB), *Popillia japonica* Newman, (see UAC § R68-15) since 1993. This insect is a serious pest of countless economically important plants. To prevent this pest being transported from infested states into Utah, the quarantine requires that nursery stock, sod, or soil meet certain precautionary standards before being imported.

In 2024, five shipments were halted prior to importation because certain items were prohibited. Plant Industry Compliance Specialists were able to identify the forbidden materials due to prenotifications sent to the department, which provided product inventories. The quarantine mandates that importing parties notify the department before shipments are sent; this requirement has proved useful in preventing violations from occurring in 2024, as well as in the past.



Ash trees in violation of Utah's quarantine being burned

Emerald ash borer quarantine violations

In 2021, UDAF enacted a quarantine on the invasive wood-boring insect emerald ash borer (EAB), *Agrilus planipennis* Fairmore, (see UAC § R68-11). EAB is a destructive pest of ash (*Fraxinus* spp.) that is known to be present in 36 states and Washington D.C. The Utah quarantine regulates ash nursery stock, firewood, and green waste. Since there are no other states in compliance with Utah's rules, ash trees are prohibited from being legally imported into Utah. UDAF continues to educate nurseries and other stakeholders about the new rules.

In 2024, there were quarantine violations found at a Davis County nursery and another in a Weber County nursery. UDAF worked with these businesses to correct the situation as quickly as possible. The contraband ash trees were examined for exit holes and other signs of EAB infestation and then destroyed. A total of five trees were burned. No signs of EAB infestation were present on the trees and the plants were destroyed prior to the emergence window of the pest. Therefore, the risk of EAB introduction due to these unauthorized importations is likely small. Nonetheless, UDAF will be conducting survey work in the areas surrounding these nurseries in 2025.

Utah's urban canopies are estimated to be composed of 15-20% ash. Should EAB be introduced into the state, this inventory represents a huge financial liability to residents and municipalities. So that these public and private natural resources can be protected, UDAF will continue educating nurseries about the quarantine and taking regulatory measures when violations are found.

R68-12- Beekeeping Standards and Preemption of Local Ordinances

In response to passage of House Bill 297 Beekeeping Inspection Act Amendments in the 2024 general legislative session, UDAF convened a working group to develop standards for counties and municipalities to follow when enacting codes or ordinances related to beekeeping on private property. The working group met on November 19, 2024 at the Taylorsville State Office Building. The group discussed trends in current municipal/county regulations within Utah and, drawing from their respective experiences, developed standards for the strictest acceptable municipal/county regulations related to beekeeping.

The group's recommended standards for the number of hives allowable on private property, location and barrier guidance for hives, swarming prevention, apiary water sources, and open feeding will be put into official state rule in April 2025, after a public comment period. Any beekeeping ordinances/codes enacted by governmental entities must not be more stringent than the beekeeping standards put into this rule. Pre-existing county/municipal regulations that do not comply with the rule will be rendered null and void. Enforcement of local regulations informed by the rule will be the responsibility of local code enforcement agencies. To read the full text of HB297, visit le.utah.gov/~2024/bills/static/HB0297.html. More information about R68-12 and the rulemaking process can be found at rules.utah.gov.

UDAF APIARY PROGRAM

Founded in 1892, the purpose of the Apiary Program is to support Utah's beekeeping industry and community through the appointment of state and county apiary inspectors. These officials help beekeepers identify and control regulated honey bee (*Apis mellifera* Linnaeus) maladies. The combined efforts of Utah's 10 county bee inspectors and two state-wide inspectors protect the state's approximately 24,000 honey-producing bee colonies, which are part of a local apiary industry annually valued at approximately $4.2 million in almond pollination services and $1.9 million in honey production.

2024 Program News & Highlights

New County Inspectors

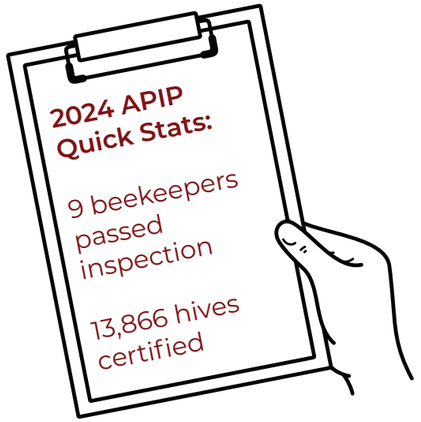
Two new county bee inspectors have been appointed in response to local beekeepers petitioning pursuant to UAC §4-11-105. Kirk Middaugh was appointed Davis County bee inspector in September 2024. Christopher Sargeant was appointed Utah County bee inspector in January 2025. Utah beekeepers can find their local apiary inspector on the Apiary Program website (see page 35 Contacts & Resources).

Second year of Apiary Pre-Inspection Program (APIP)

2024 was the second year that migratory beekeepers overwintering hives in Utah could participate in the voluntary apiary pre-shipment inspection program (APIP), which is administered through the California Department of Food and Agriculture (CDFA) in conjunction with UDAF. CDFA inspectors traveled to Utah and worked alongside UDAF Apiary Program staff to perform inspections of indoor winter bee storage operations (Figure 1), certifying operations with equipment free of insects, debris, mud, small hive beetle, and plant material. Inspection at the California border is expedited for shipments of certified colonies, which puts less stress on the transported bees.

100% of beekeepers who participated in APIP in 2023 and again in 2024 were certified. With the addition of six new participants, this resulted in twice as many hives being certified through APIP in 2024 as compared to last year. Going forward the UDAF Apiary Program will request training from CDFA officials on performing outdoor staging yard inspections, which would allow more beekeepers to utilize this voluntary inspection program.

Figure 1. UDAF apiary inspectors look for insects, debris, and plant material on indoor overwintered migratory beehives and palletes.



Beekeeper Registrations

As of December 2024, there are 905 registered beekeepers in the state of Utah. The Utah Bee Inspection Act states that any person raising bees within the state of Utah is required to register with UDAF (UAC §4-11-104).

Inspection Results

The primary way apiary inspectors connect with beekeepers and detect apiary disease is through boots-on-the-ground hive inspections. In 2024, inspectors performed 577 inspections (Figure 2) across 488 apiaries, totaling 2,689 individual hives inspected across the state.

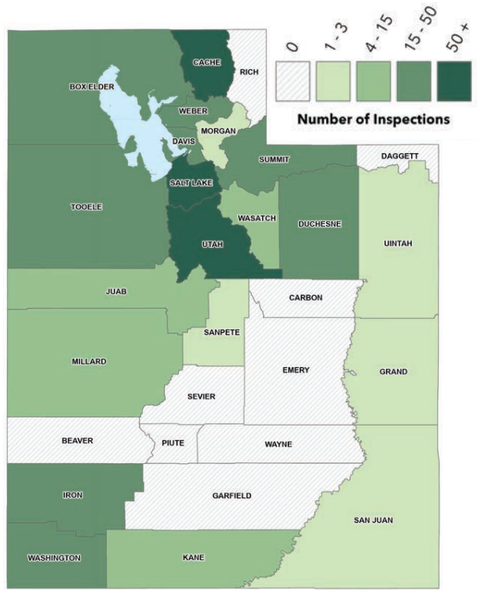


Figure 2. Number of apiary inspections performed in each county in 2024 by state and county apiary inspectors. Excludes self-inspections of an inspector's own apiary.

Bacterial Diseases

American foulbrood (AFB) is the most devastating honey bee disease and is consequently regulated by the state. The spores produced by its causative bacterial agent, *Paenibacillus larvae*, remain viable for at least 40 years in used beekeeping equipment, and can spread when bees rob resources from infected colonies. Hives found infected are promptly treated with antibiotics or destroyed. Apiary inspectors follow up with every lab-confirmed AFB case to ensure compliance. In 2024, 29 individual hives were confirmed to be infected with AFB across 16 apiaries, approximately 1.1% of hives inspected (Figure 4).

The primary way apiary inspectors detect apiary disease is through boots-on-the-ground hive inspections.

The majority of AFB-infected hives were in Utah County. Other outbreaks occurred in Kane, Washington, Juab, Millard, Salt Lake, Davis, and Summit counties (Figure 3). Due to the highly infectious nature of AFB, registered beekeepers are sent a notification letter whenever an outbreak occurs within two miles of their registered apiaries. In 2024, 60 AFB outbreak letters were mailed.

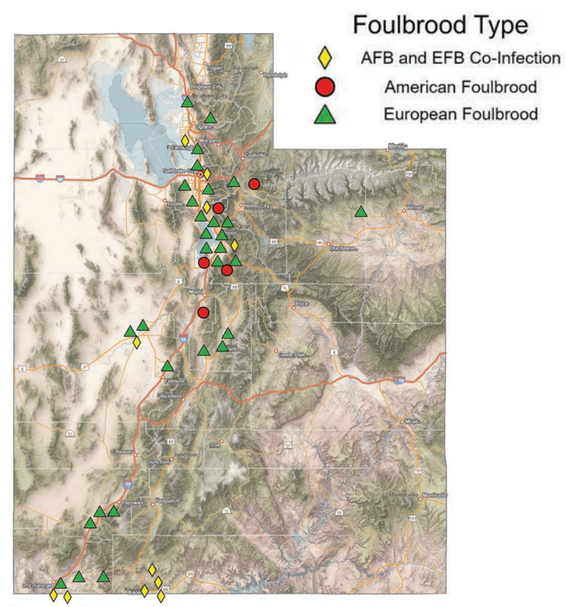


Figure 3. Map of lab-confirmed foulbrood cases in 2024. Points are dispersed to protect beekeeper privacy.

2.8% of inspected hives were infected with European foulbrood (EFB) (Figure 4). This brood disease is caused by the bacterium *Melissococcus plutonius.* Mild EFB may clear up on its own, but severe infections may require antibiotic intervention.

Fungal Diseases

Compared to last year, the number of diagnosed cases of Nosema disease – a result of the parasitic microsporidia *Vairimorpha ceranae* and/or *Vairimorpha apis* – declined in 2024. Only 15% of Nosema-tested bee samples processed by the UDAF Entomology Lab showed *Vairimorpha* spore counts above threshold levels.

Chalkbrood disease, caused by the fungus *Ascosphaera apis*, was found in 4.1% of inspected colonies (Figure 4). While not a death sentence on its own, chalkbrood can leave a colony vulnerable to other diseases if left unchecked.

Parasites

The *Varroa* mite, *Varroa destructor* Anderson & Trueman, continues to be the number one killer of beehives in Utah. 6.7% of inspected hives were diagnosed with parasitic mite syndrome (PMS) in 2024. This disease complex is characterized by a combination of high *Varroa* numbers, observed symptoms of viruses known to be transmitted by the mites (deformed wing virus, sacbrood virus, and chronic bee paralysis virus), and visual signs of *Varroa* parasitism in the brood (Figure 6). If untreated, PMS will lead to colony collapse.

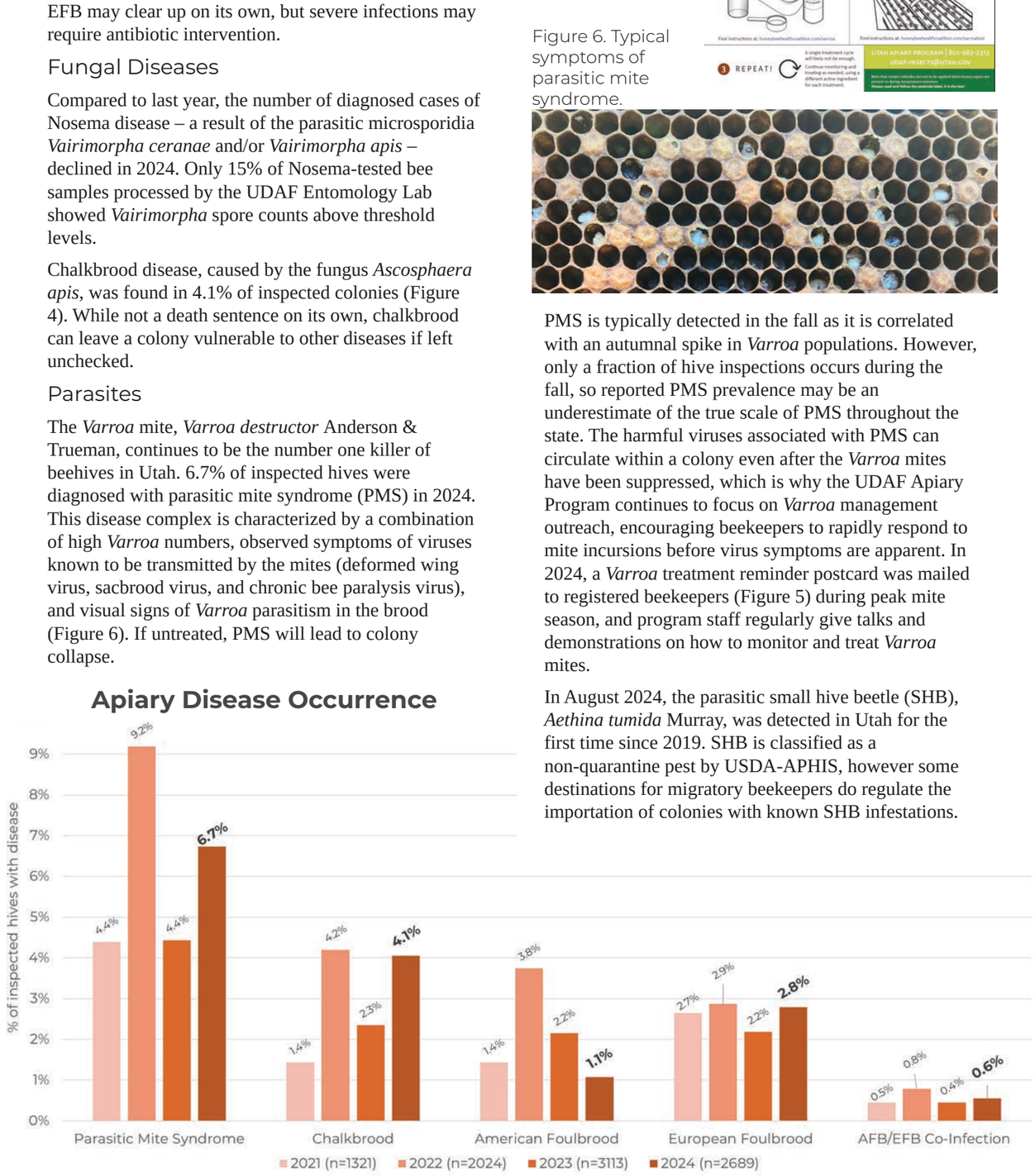


Figure 4. Comparison of apiary disease occurences by year. AFB and EFB cases include both lab-confirmed and field-diagnosed cases.

Figure 5. Back side of *Varroa* postcard mailed to all registered beekeepers.

Figure 6. Typical symptoms of parasitic mite syndrome.

PMS is typically detected in the fall as it is correlated with an autumnal spike in *Varroa* populations. However, only a fraction of hive inspections occurs during the fall, so reported PMS prevalence may be an underestimate of the true scale of PMS throughout the state. The harmful viruses associated with PMS can circulate within a colony even after the *Varroa* mites have been suppressed, which is why the UDAF Apiary Program continues to focus on *Varroa* management outreach, encouraging beekeepers to rapidly respond to mite incursions before virus symptoms are apparent. In 2024, a *Varroa* treatment reminder postcard was mailed to registered beekeepers (Figure 5) during peak mite season, and program staff regularly give talks and demonstrations on how to monitor and treat *Varroa* mites.

In August 2024, the parasitic small hive beetle (SHB), *Aethina tumida* Murray, was detected in Utah for the first time since 2019. SHB is classified as a non-quarantine pest by USDA-APHIS, however some destinations for migratory beekeepers do regulate the importation of colonies with known SHB infestations.

Two suspect adult SHB (Figure 7) were collected from a dead migratory beehive in Huntsville, Weber County, and the adult beetles were confirmed as *A. tumida* via morphological identification by USDA diagnostic entomologists. The impacted beekeeper was provided beetle traps and beetle oil and instructed to monitor for any SHB larvae in that apiary, which would indicate if the beetles were reproducing. No SHB larvae were observed, and no additional adult beetles were observed while the beehives were in Utah. Utah's dry soil and climate are thought to be unfavorable to the SHB lifecycle. UDAF Apiary Program staff will continue to monitor for SHB in the coming years and encourage all beekeepers to report suspect SHB in their hives.

Figure 7. Small hive beetles observed under dissection microscope.

Africanized Honey Bee (AHB) & Aggressive Bee Colonies

Apis mellifera scutellata Lepeletier, also called the Africanized honey bee (AHB), is a hybrid subspecies of honey bee notorious for its aggressive behavior. AHB is considered a public safety concern due to its heightened stinging response as compared to typical managed honey bee stocks, though few instances of AHB-related stinging attacks have been reported in Utah. The UDAF Apiary Program has monitored AHB spread throughout the state by testing bees from managed and feral colonies in at-risk areas.

In 2024, state apiary inspectors responded to seven reports of aggressive bees by performing temperament tests on hives in the reported apiaries. UAC §4-11-115 prohibits beekeepers from intentionally maintaining aggressive bees, regardless of their genetic origin. One tested colony showed aggression responses above threshold levels and was requeened. Worker bees from two of the reported aggressive colonies in Davis County, an area with no known AHB, were sent to the Florida Department of Agriculture and Consumer Services Honey Bee Diagnostic Laboratory to be tested for Africanized genetics. Mitotyping results from both samples revealed no Africanization of the queens.

For more info about AHB in Utah, visit the apiary program website and click on "Africanized Honey Bees"

Utah *Varroa* mites show amitraz-resistant genotypes

A variety of chemical treatments for *Varroa* mites are on the market, but not all treatments work the same way, nor are they equally effective. Amitraz, the active ingredient in popular mite treatments, is of particular interest to scientists as reduced treatment efficacy has been observed by beekeepers across the nation in recent years. Scientists hypothesized that *Varroa* mites have developed resistance to the chemical. This would be bad news for many beekeepers. State apiary inspection data show that amitraz was used within the past year in nearly a quarter of Utah apiaries inspected (23%). In 2024 UDAF Apiary Program staff collaborated with USDA-ARS research entomologist Frank Rinkevich to genetically sequence mites collected during standard health inspections across the state (see map to the right) and determine the frequency of amitraz resistance genes. Preliminary results showed that on average, **92%** (ranging from 50% to 100% of mites in a given sample) **of mites from sampled apiaries were amitraz-resistant (Figure A).** This high level of amitraz-resistant genotypes in *Varroa* means that application of amitraz-based miticides will result in treatment failure at the colony level. Concerningly, amitraz-resistant mites were found in beekeeping operations with no previous history of amitraz use, and the majority of samples contained no amitraz-susceptible mites at all. These results are informative for apiary inspectors who are often asked for advice on *Varroa* treatments.

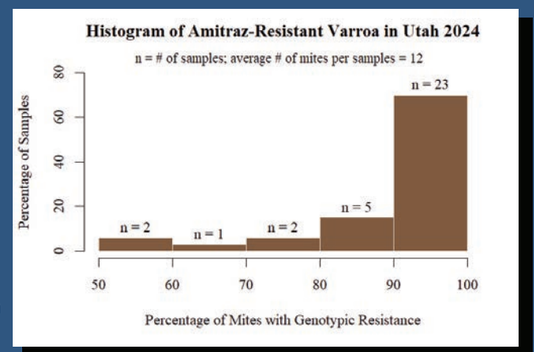


Figure A. Frequency of amitraz-resistant genotypes in Utah *Varroa* samples collected in 2024.

Health Certificates

Upon request, the UDAF Apiary Program offers health certificates to registered beekeepers verifying that their operation is pest and disease-free. This may be necessary for beekeepers to maintain eligibility for federal farm assistance programs, to certify that colonies are not infected with regulated maladies prior to interstate movement, or to use as a selling point to their customers. In 2024, eight health certificates were issued, totaling 4,744 colonies that were certified as free of regulated pests and disease.

Outreach & Pollinator Protection

Outreach and education as a means of encouraging regulatory compliance is a high priority for UDAF. Throughout 2024, apiary inspectors delivered multiple talks targeting beekeepers and pesticide applicators. Inspectors also engaged in multimedia collaborations to promote compliance with the Utah Bee Inspection Act.

In addition to continued outreach targeting practicing veterinarians, interdepartmental efforts with the state veterinarians in UDAF Animal Industry were initiated in 2024. The goal of these efforts is to make antibiotics more readily available to beekeepers who need antimicrobials for regulatory compliance.

As part of UDAF's EPA-approved voluntary Managed Pollinator Protection Plan (MP3), outreach signage (Figure 8) was placed in various consumer box stores throughout Utah, educating shoppers on best use practices to minimize pesticide drift. Additionally, UDAF-funded insecticide treatments in relation to the ongoing Japanese beetle (JB) eradication project (see JB Eradication page 9) were supervised by UDAF Apiary Program and Pesticide Program staff, ensuring applications were compliant with the pesticide label. Registered beekeepers in JB treatment areas could opt-in to treatment notifications and could also request materials to protect their hives.

Figure 8. Signs placed in various stores promoting compliant pesticide application practices.

2023 National Honey Bee Disease Survey (NHBDS) Results

Since 2011, the UDAF Apiary Program and beekeepers throughout the state have participated in this nation-wide survey of honey bee health which is funded by USDA-APHIS. Taking an epidemiological approach, the survey consists of taking samples of bees and brood from sideliner or commercial apiaries throughout the state, which are sent to the USDA Bee Research Laboratory in Beltsville, Maryland. Samples are tested for various emergent invasive threats and screened for diseases known to be present in North America. Sample processing takes time, and results typically are not available until the following year. Results discussed below are from the 2023 sampling season.

To date, no exotic pests have been found in Utah. NHBDS data show that average *Varroa* mite levels were lower than the national average in 2023 and lower than Utah's mite levels in previous years.

Despite low *Varroa* loads in 2023, virus levels were well above the national average for deformed wing virus-B (DWV-B), lake sinai virus (LSV2), israeli acute bee paralysis virus (IAPV), and moku virus (MKV) (Figure 9). This is puzzling due to the known close association of these viruses with *Varroa* mites. However, some of these viruses can be spread from queen to offspring and between workers via feeding behavior, which may explain why high virus levels were observed in hives with low mite loads.

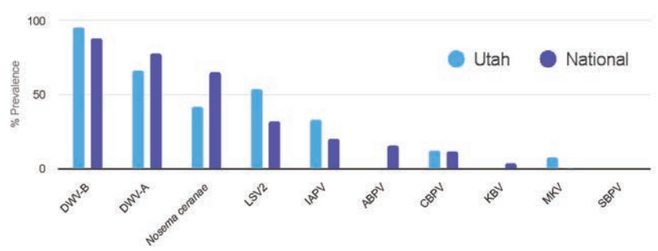


Figure 9. Molecular pathogen prevalence in NHBDS samples. Comparing Utah in 2023 (n=24) to national average since 2013 (n=9364). From usbeedata.org.

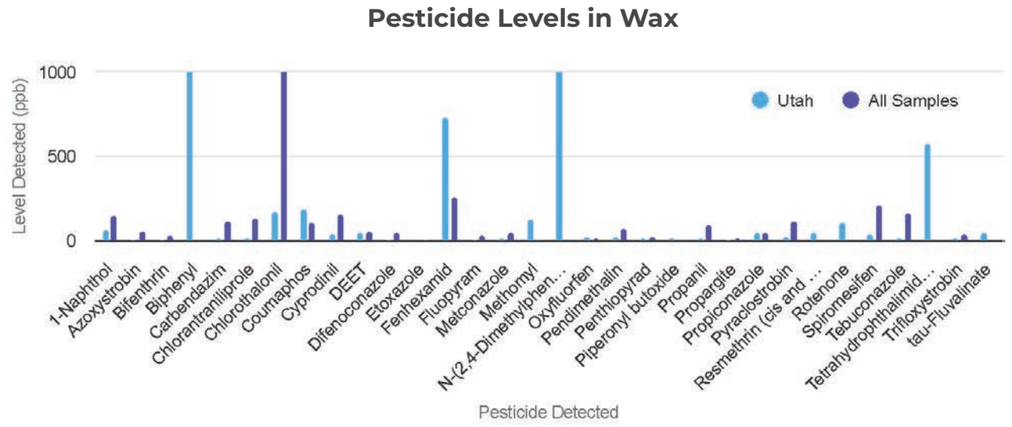


Figure 11. Pesticide levels in wax. Comparing levels found in Utah during 2023 (n=10) to average national level of these pesticides found in wax samples for all years (n=1416). From usbeedata.org.

Average Nosema disease levels in 2023 were well above both the national average and Utah Nosema levels in previous years (Figure 10). This confirms that Nosema disease was indeed a significant problem for Utah beekeepers in 2023, and aligns with the high occurrence of Nosema disease in samples processed by the UDAF Entomology Lab last year (for more information, see the 2023 Insect Report page 6).

Beekeepers participating in the longitudinal NHBDS also have samples of secondary hive products tested for pesticide residues. For the first time in years, pesticide residues in sampled beehives were above the national average for multiple pesticides (Figure 11). The top five pesticides observed in 2023 wax samples included metabolites of mite treatment products, pollutants, and fungicides.

Mite treatment products, when used according to label instructions, benefit colony health by reducing *Varroa* mite populations. However, the accumulation of these acaricides in the wax over time may have adverse effects on colony health.

The effects of pollutants on pollinators are unclear, though honey bees and hives may be useful biomonitoring tools for assessing environmental pollutant levels.

The observed fungicides and their breakdown products are generally considered relatively non-toxic to honeybees according to the EPA, though scientific evidence suggests that chronic exposure is associated with poor hive health outcomes.

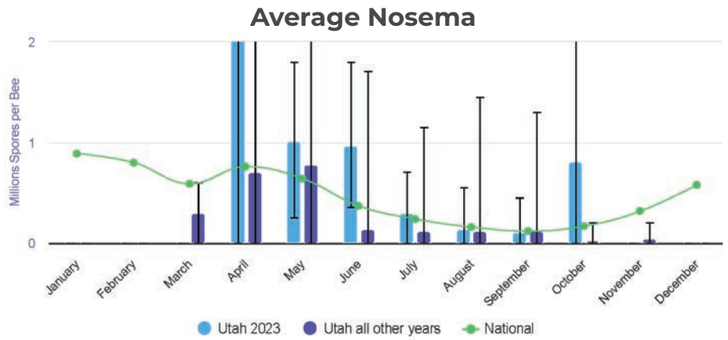


Figure 10. Average nosema spore loads by month. Comparing national average (n=11558) to Utah in 2023 (n=24) and Utah in all other years (n=285). From usbeedata.org.

NHBDS National Honey Bee Disease Survey

APHIS

For more information about the NHBDS and to view the full state report, visit usbeedata.org and click on Utah

CONTAINED ...AND TO BE ELIMINATED

The state effort to eradicate Japanese beetle continues

In 1916, Japanese beetle (JB), *Popillia japonica* Newman, was first detected in the U.S. by a New Jersey agricultural inspector. It is thought that the insect was transported via Japanese irises, *Iris ensata*, to a "Garden State" nursery imported from Japan. The destructive impact of this pest was quickly apparent, as many plants in the area began to suffer from its feeding. Despite efforts to contain and eradicate the pest, it quickly spread throughout the state and, in subsequent decades, across the Northeast, South and Midwest. Today, JB infests nearly every state east of the Rocky Mountains.

Although Utah has had JB detections in the past, the pest has never become established because of swift response measures taken whenever it is found. UDAF is tasked with the responsibility of finding JB whenever it is introduced and eradicating populations before they establish. The state is currently in the midst of a second eradication campaign, which has delivered promising results in certain areas and uneven outcomes in others.

JB as a Pest

JB is known to attack over 300 fruit, vegetable, and ornamental plants. In Utah, there is particular concern about its impacts on plants commonly grown in the state, such as tart, sweet, and ornamental cherry (*Prunus* spp.), edible and ornamental apple (*Malus* spp.), corn (*Zea mays*), turf (various genera), roses (*Rosa* spp.), and many types of bedding plants. JB is subterranean in its larval stage and will feed on turf roots from late summer to early spring of the following year. Pupation occurs underground in late spring and adult emergence begins shortly after. When JB adults come out of the ground, they begin to feed on above ground plants such as hosts previously mentioned. Adults mate in the summer and females lay eggs underground which continues the life cycle.

History of JB in Utah

The UDAF JB Program began in 1993 when a quarantine was enacted on agricultural commodities capable of transporting the insect. The quarantine is still in place today and requires that nursery stock, sod, and soil imported from infested states meet certain precautionary requirements to prevent the pest from being introduced into Utah. Agricultural inspectors verify that nurseries and agricultural supply stores are following quarantine rules; these efforts are considered a "first line of defense" against the pest.

To monitor for JB introductions, UDAF began an annual statewide trapping survey in 1996. For many years, no JB were found, but by 2006, JB was detected in the city of Orem by a local resident. UDAF responded quickly to this finding and placed hundreds of traps around the detection site. This would reveal a population of the invasive pest that was in the thousands. With the support of the agricultural community and the city of Orem, UDAF sprang into an eradication program, which involved treating hundreds of acres of turf with a larvicide over multiple years. Just five years after the first detection, no JB could be found in Orem and the eradication was officially declared just a few years later.

A more detailed history of JB in Utah can be found in previous years of the Insect Report

A New Infestation

There was little to report about JB in Utah after the Orem eradication. In subsequent years, detection numbers stayed close to or at zero, and high-density trapping near those detections would not find any additional beetles.

This all changed in 2018, when three JB were found in Salt Lake City's industrial district. Trapping in subsequent years would reveal more beetles in the greater Salt Lake area, as well as in Davis, Utah and Weber counties. Consequently, in 2020, the state began a new eradication campaign to eliminate the nascent populations. To date, this program has treated approximately 1,000 acres of irrigated turf in areas where JB presence could lead to a stable population. The eradication campaign has been highly successful in either eliminating or dramatically reducing JB populations in many areas of the Wasatch Front such as Centerville (which was once considered an epicenter of JB activity), Kaysville, Lehi, Uintah, South Weber, West Point, and West Valley City. Yet many areas continue to have persistent low-level populations of the invasive insect, including Farmington, Ogden, Riverdale, Salt Lake City, South Salt Lake, and Washington Terrace.

2024 Eradication Treatments

Scientists have determined that pesticide treatments are most effective when JB is underground in its larval stage. JB larvae prefer to eat grass roots and are especially attracted to irrigated turf, as these areas have soil moisture levels conducive to the insect's survival. Consequently, the UDAF Insect Program conducts all of its JB eradication treatments on irrigated turf.

In 2024, the number of acres treated for JB in Salt Lake and Weber counties was nearly double that of the previous year, while Davis County treatment acreage fell by approximately 30%. In total, insecticide was applied to 230 acres of host material across 1,083 parcels among all three counties. Treatment areas were based on JB capture sites during the 2023 survey. The standard eradication protocol prescribes that anytime a JB trap captures at least one female or two specimens (any sex), all irrigated turf within a 650 foot buffer of that trap is treated in the following year.

In 2024, the program relied exclusively on chlorantraniliprole as the control product. This pesticide is considered a "Reduced Risk Insecticide" by the U.S. Environmental Protection Agency due to its low acute toxicity to humans, other mammals, birds, and beneficial invertebrates, such as bees and earthworms. The UDAF Pesticide Program supervised the private company hired to conduct treatments to ensure that all state and federal pesticide rules were followed during applications. In the treatment areas, the UDAF Insect Program removed flowering weeds that might attract pollinators and provided notice of applications to registered beekeepers.

2024 Survey and Detections

2024 proved to be another record-breaking year for JB trap placement in Utah. A whopping 6,166 traps were deployed across all 29 of the state's counties. Most of the traps placed were set as part of delimiting grids in areas where JB have been detected in recent years. Delimiting grids are high-density trapping arrangements that determine the frontiers and densities of pest infestation. A delimiting grid is set any time a JB is found and will expand in the direction of subsequent captures until no new captures are found in that same direction.

In total, 129 JB were detected from trapping efforts. Salt Lake and Weber counties led the pack with 53 beetles each, Davis County had 21 beetles, and Utah County had just two. When compared to previous years, the JB population in areas where the beetle is expected to thrive are drastically declining. These places have bountiful host material and include residential areas, parks, and golf courses. Conversely, the populations are relatively unchanged in industrial areas that mostly consist of unsuitable habitat.

Solving the JB Infestation Puzzle

The principal issue with the current eradication campaign in Utah is determining why JB populations have been eliminated in areas where host material is plentiful and conditions are favorable, while low-level populations persist in places with little host material and hostile conditions. The results are simply counterintuitive: it should be easier to eliminate a pest in areas hostile to its survival and more difficult to eradicate it from places that are favorable to survival; not the other way around.

In 2023, the obstinate infestations characteristic of certain areas led UDAF Insect Program staff to deeply explore why the eradication progress was mixed. Staff sought input from multiple scientists as well as other subject matter experts and came up with three main hypotheses:

1. JB are reproducing in dry soils with unmanaged grasses
2. JB are hatching out of certain areas and flying to traps further away
3. New introductions of JB are continuing to occur

To explore these possibilities, program staff devised and executed a series of different investigations and actions in 2024.

Are JB reproducing in dry soils with unmanaged grasses?

Soil Moisture Testing

One way to determine whether JB could be reproducing in dry soils is to evaluate if such soils are moist enough to support minimum requirements for the insect's reproduction and survival. According to a scientific assessment of female JB oviposition preferences by Allsopp, Klein, and McCoy (1992), the insect will either lay few eggs or no eggs at all in dry soils. These authors demonstrated that if JB are given a choice of soils with different moisture profiles, the beetles will not lay eggs in soils that are equal to or less than 5% moisture content. The study also demonstrated that if JB are only given dry soil, the insects will reduce overall egg laying significantly.

Consequently, UDAF Insect Program staff began a series of soil moisture tests at 10 sites where JB were captured by traps in the 2023 survey season. All of these sites were in Salt Lake City's Northwest Quadrant and part of land use that included well-irrigated managed landscapes and non-managed natural areas. Because there was delay in receiving the moisture testing equipment, these sites were only tested twice during the JB emergence period. Nonetheless, the initial results were interesting. In mid-July, only one third of the non-managed natural area sites sampled had soil moisture content that was high enough to induce JB egg-laying activity. By early August, that percentage was reduced to 22%. In two of the cases where the soil moisture measured above the threshold, the soil moisture was recorded as 5.5%, which is hardly considered to be favorable conditions. Half of all tests performed found soil to have 0% moisture content. Conversely, all sites in managed landscapes had soil moisture well above the 5% threshold. This initial year of testing suggests that the unmanaged environment where JB has been found in recent years is, for the most part, extremely harsh and inhospitable to JB oviposition activity. Thus, in the areas evaluated, it would seem unlikely that JB would pick unmanaged natural habitats to lay eggs but instead move to nearby managed landscapes with irrigated turf. However, more testing will be needed in subsequent years to substantiate such a conclusion.

JB Detection Canines

At the request of UDAF, the USDA Animal Plant Health Inspection Service (APHIS) arranged to have APHIS-funded detector canines trained in JB larvae detection sent to Utah in Spring of 2024. The dogs are trained and handled by Auburn University's College of Veterinary Medicine's Canine Performance Sciences (CPS) program via a cooperative agreement with APHIS. The program is a renowned center for canine breeding, development, and training for detection of many types of threats to national security and public safety, including high-risk agricultural pests.

The aforementioned persistent low-level JB populations in some areas inspired UDAF to explore the use of these detection dogs. Specifically, these dogs may be helpful in elucidating whether the JB are actually reproducing in these areas or if they are being newly introduced.

Auburn University handlers and dogs surveyed multiple areas around Salt Lake County where JB have been found consistently in previous years, including a park, a canal, a golf course, and numerous industrial areas. The dogs were trained to give a signal to the handlers when they possibly found JB. When this happened, UDAF and CPS staff would dig in the area around the potential detection and look for grubs. Although white grubs and other insects were found at many of these locations, none were JB.

Because these animals were considered to be in a pilot stage of training, no firm conclusions could be derived from these efforts. Nonetheless, UDAF was extremely

Continued on page 20

1 Linda, an Auburn Canine Peformance Sciences detection dog, surveys for JB grubs.

2 Staff dig into ground where a detection dog indicates that grubs might have be present. A total of 25 plots were dug across three sites in Salt Lake County.

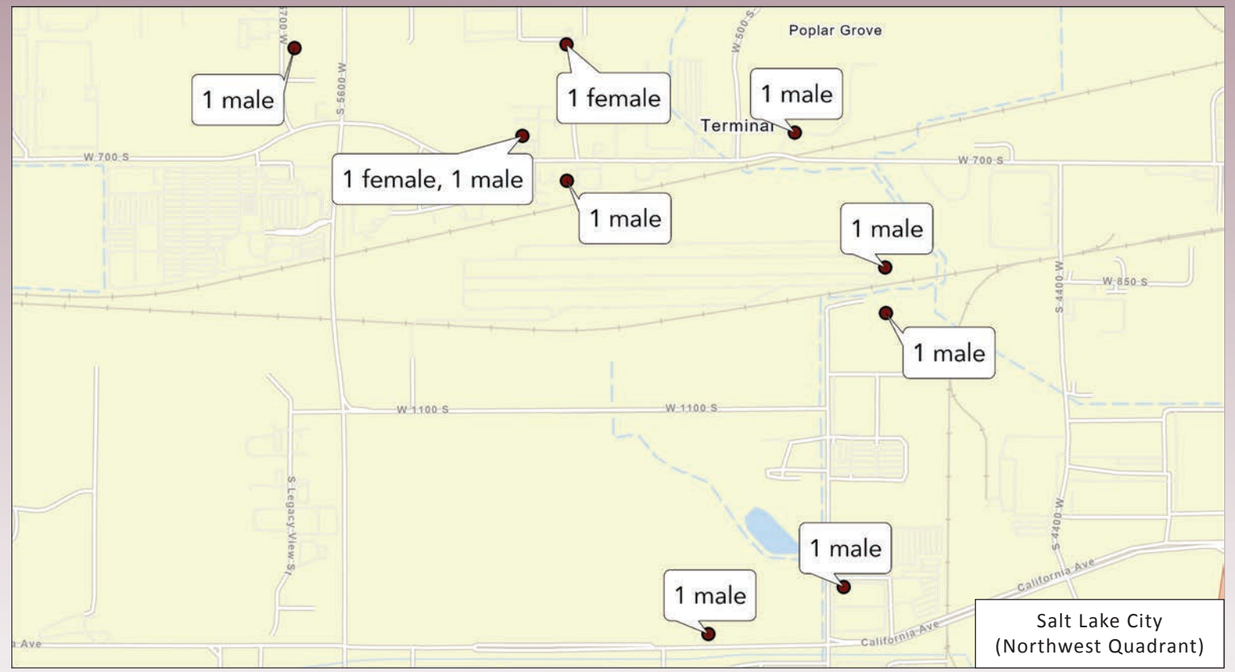
3 Soil in unmanaged area being tested for moisture content.

4 Staff educating the public about the eradication effort.

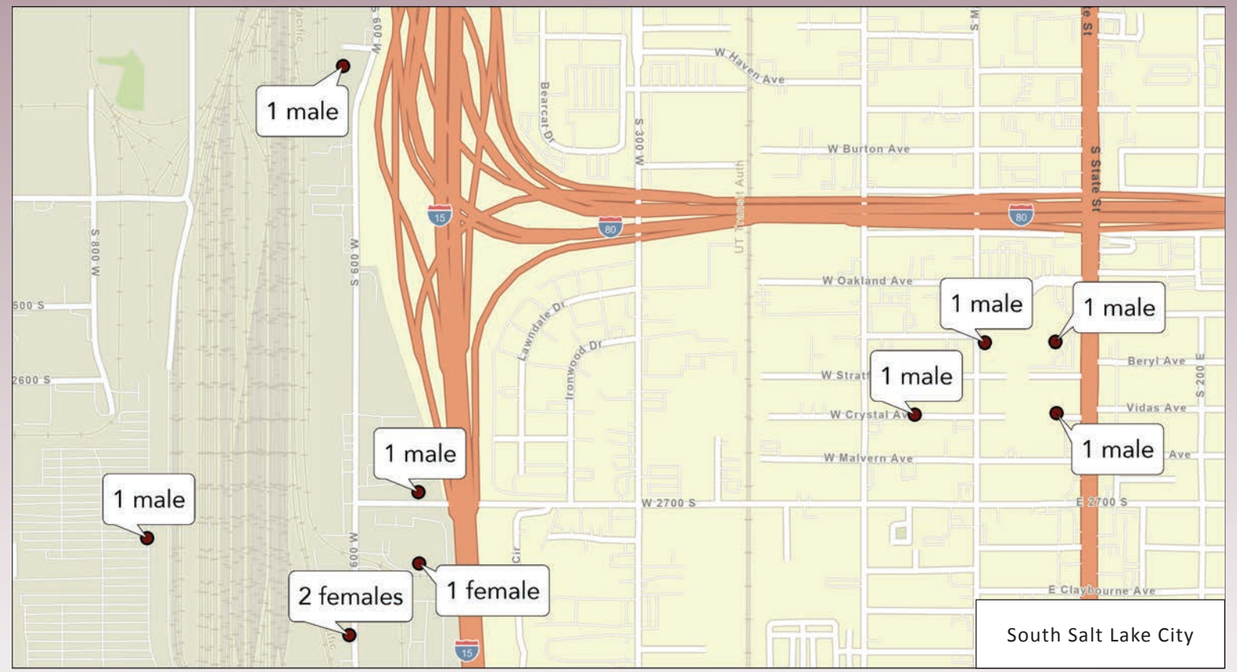
5 Large turf plot being treated with a ride-on sprayer.

2024 JAPANESE BEETLE DETECTION MAPS

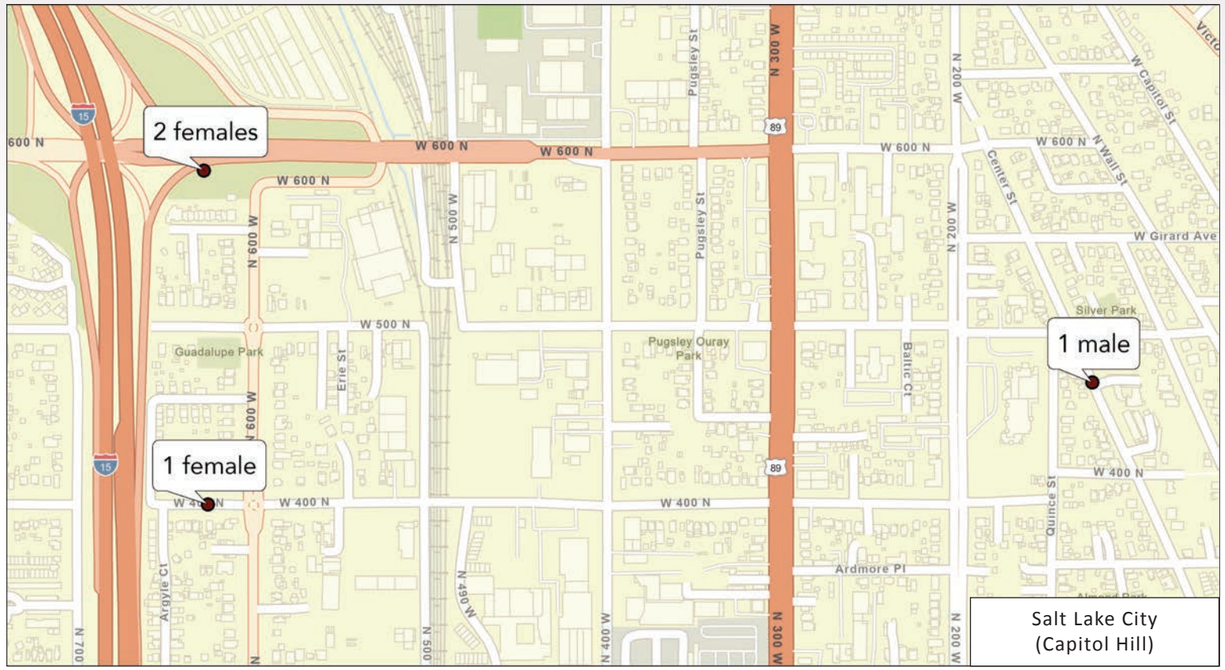
Salt Lake County



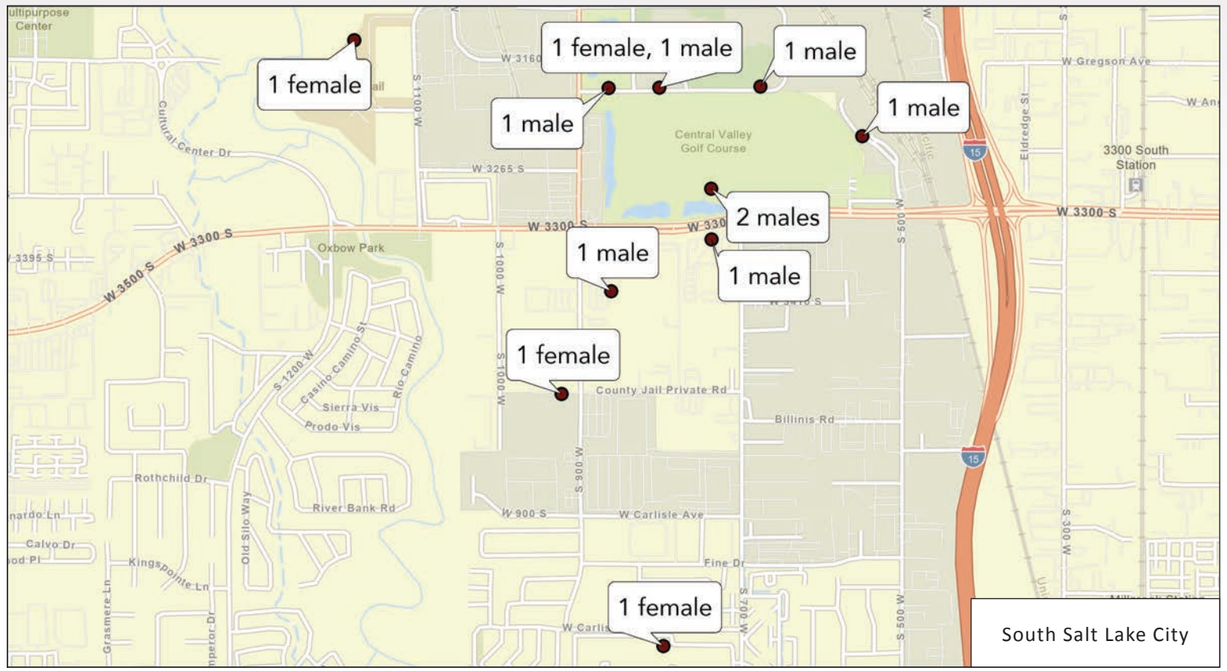
Salt Lake City
(Northwest Quadrant)



South Salt Lake City

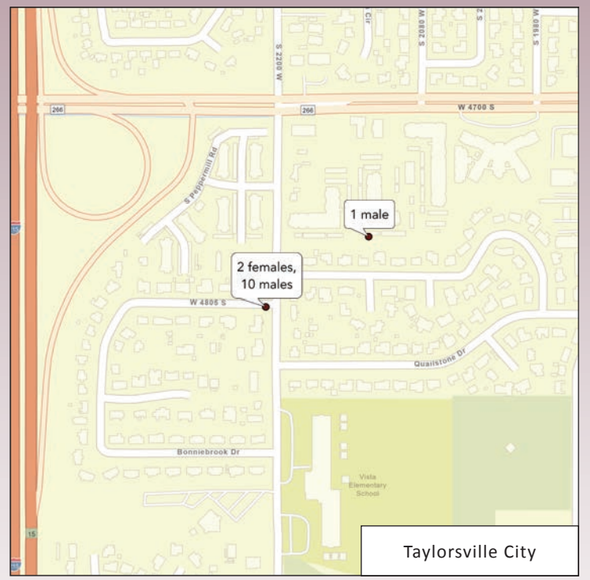


Salt Lake City
(Capitol Hill)



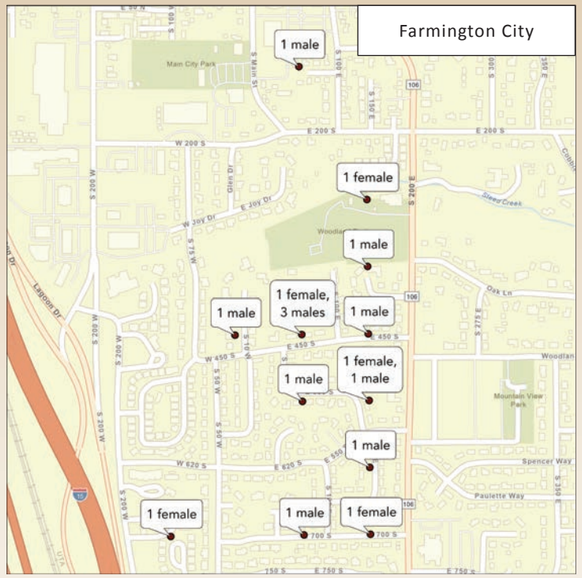
South Salt Lake City

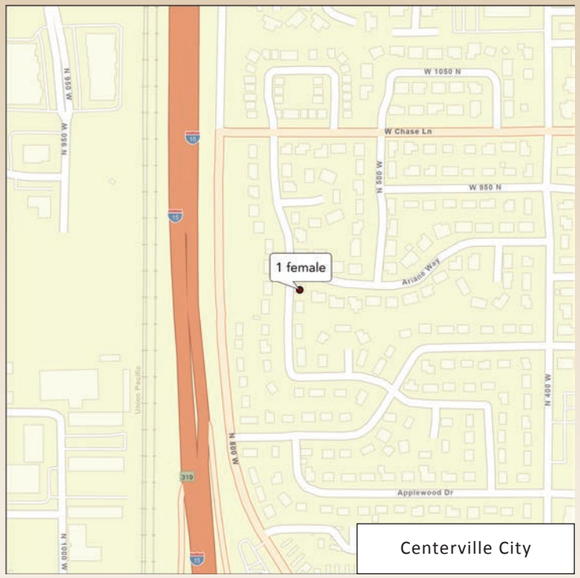
Salt Lake County (continued)



Taylorsville City

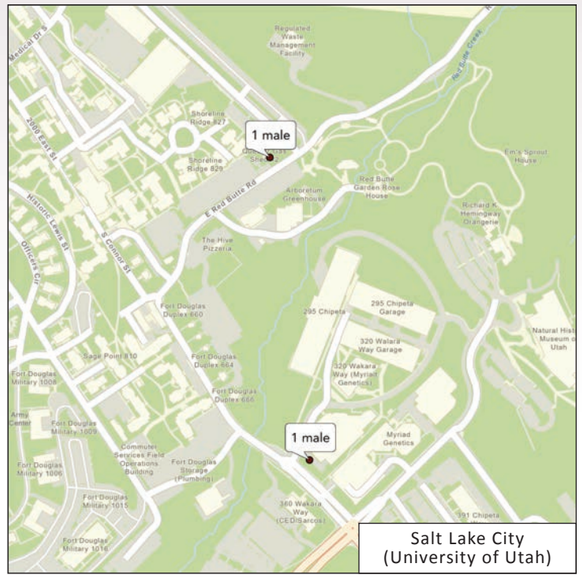
Murray City





Centerville City

Sandy City



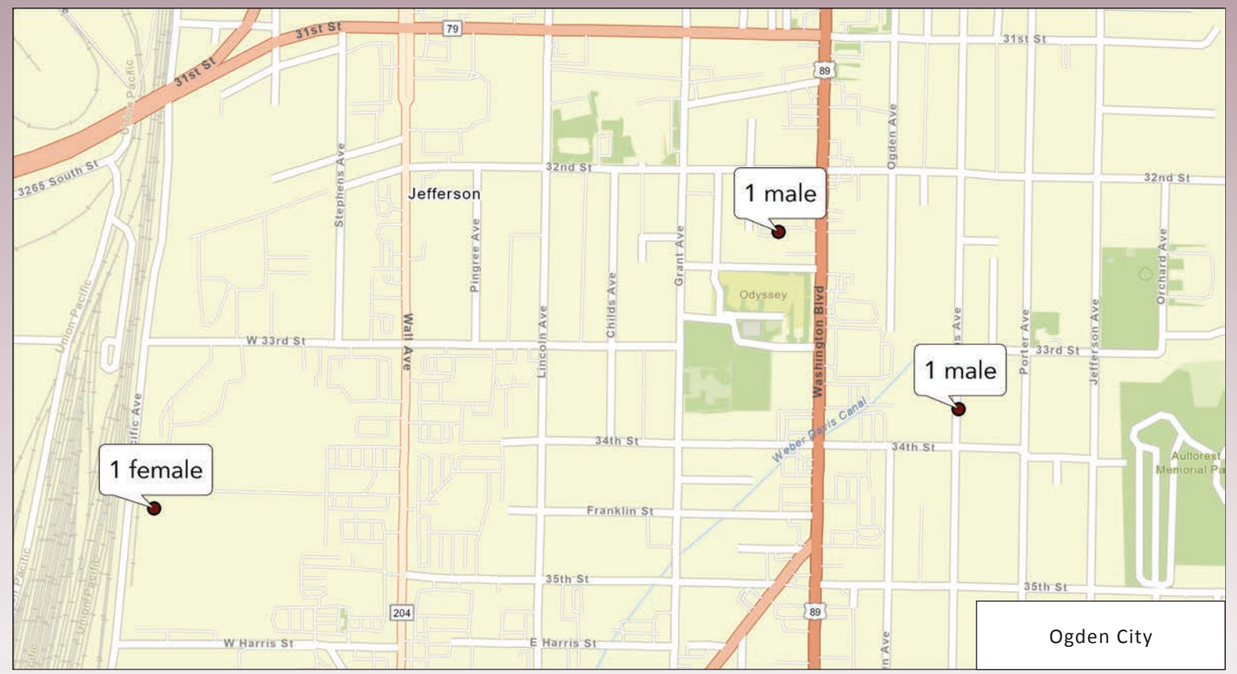
Salt Lake City (University of Utah)

Kaysville City

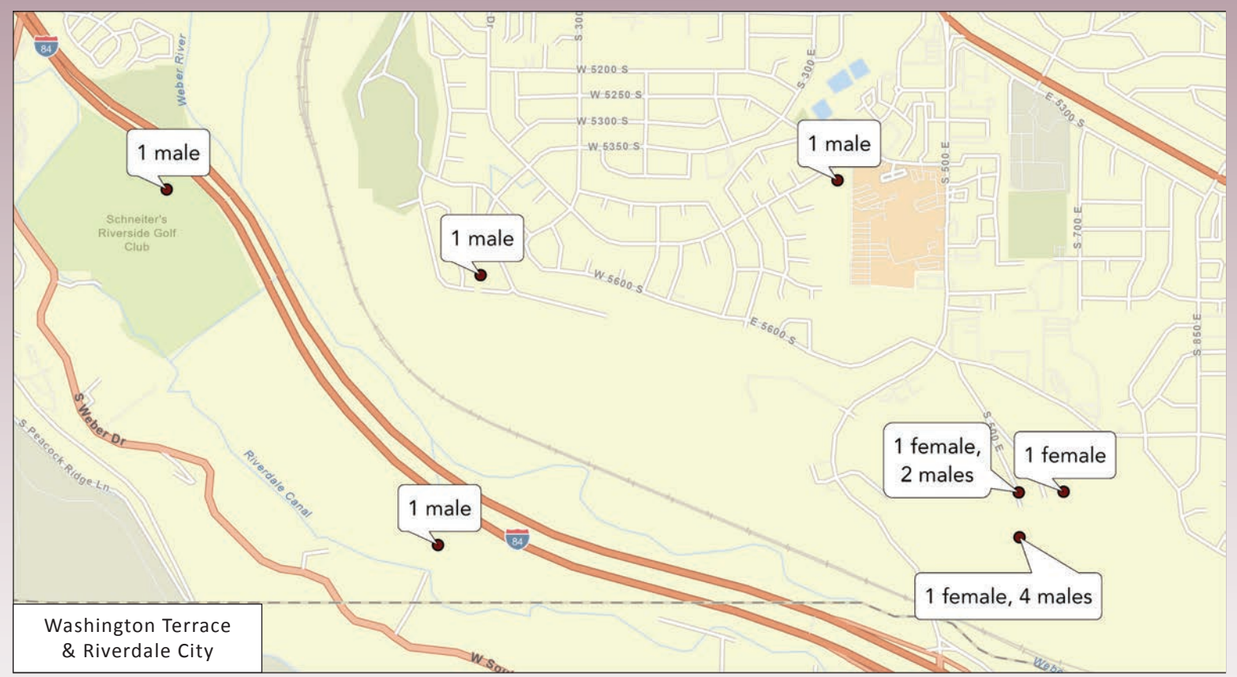
South Weber City

Davis County

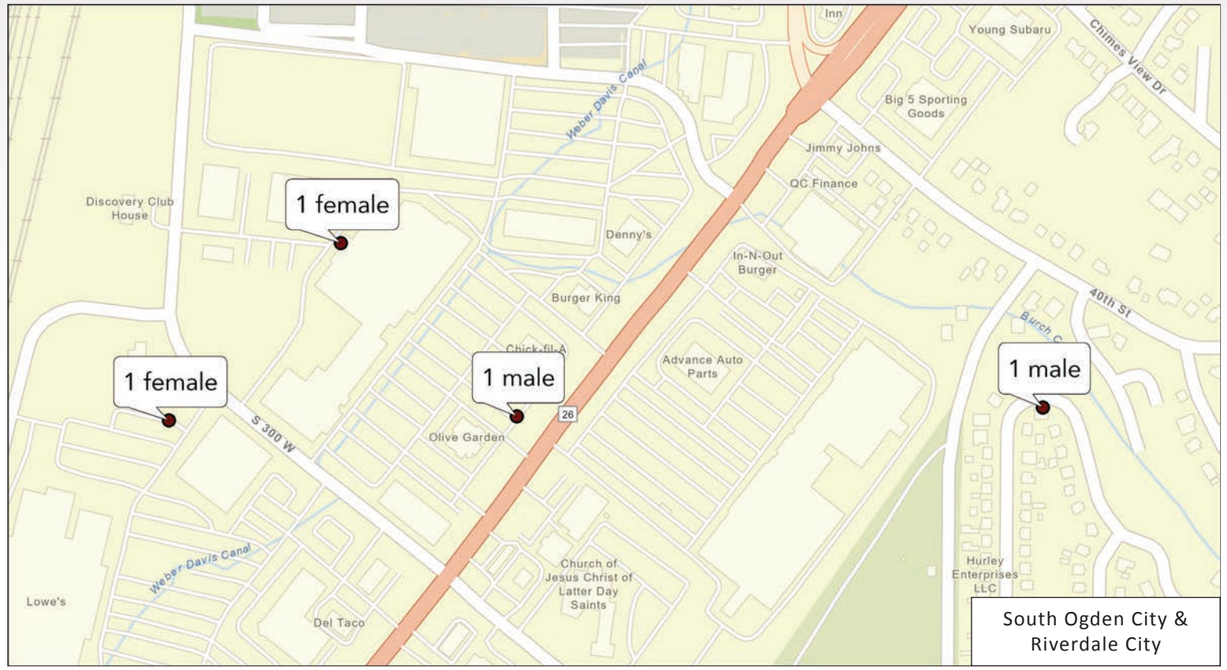
Weber County



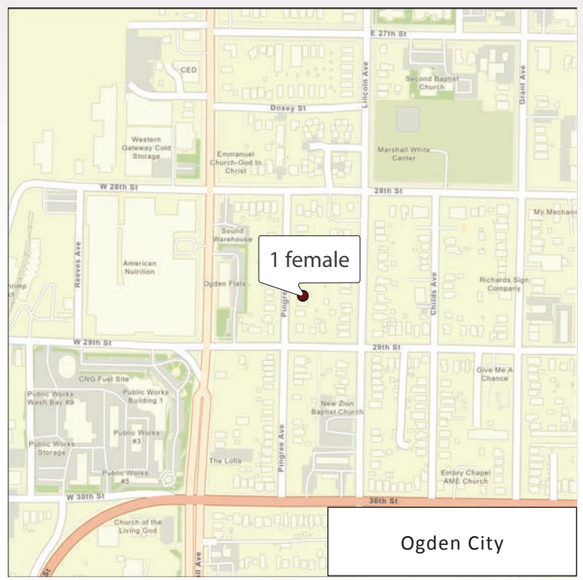
Ogden City



Washington Terrace & Riverdale City



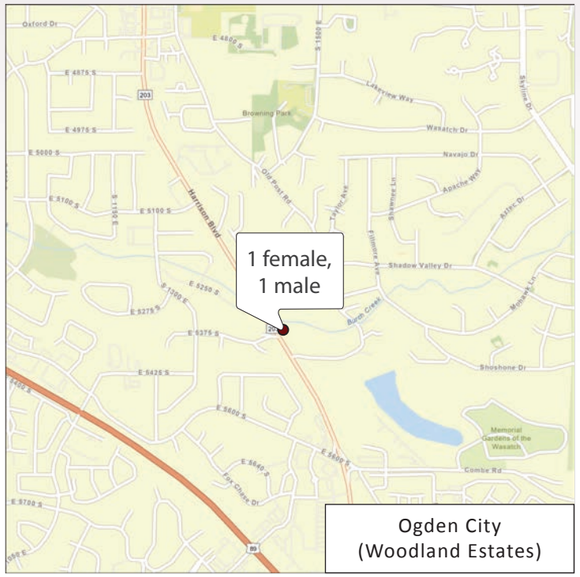
South Ogden City & Riverdale City

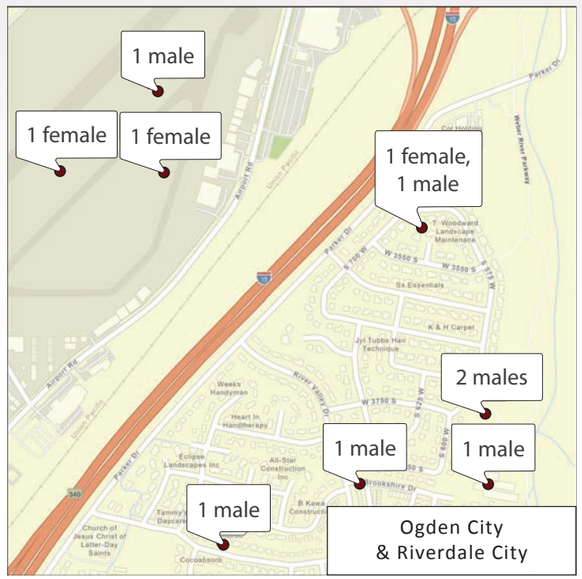


Ogden City

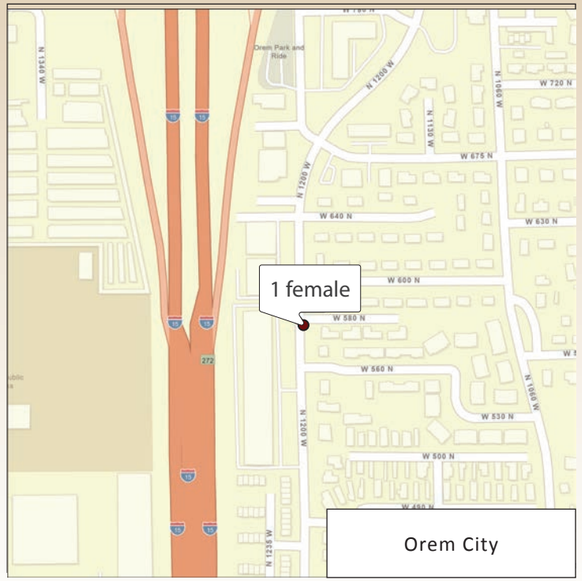
Ogden City

Weber County (continued)





Utah County



grateful to have the support of Auburn University's program and found value in the information gathered from the digging work. UDAF will seek future opportunities to collaborate with the program again.

What if JB are hatching out of certain areas and flying to traps further away?

Given the limited research capabilities of the program, it was not possible to evaluate whether JB were hatching out of the ground in well-suited environments and flying to traps located in land use areas not favorable to the beetle. Therefore, the program decided to "err on the side of caution" by assuming that this possibility might be true. This resulted in an expansion of the treatment buffers in industrial areas with persistent, year-over-year JB populations: instead of treating irrigated turf within 650 feet around an actionable detection site, as is standardly practiced, the radius of treatment area was doubled.

While it is not known whether this change in protocol is having the intended effect, it added relatively little additional turf acreage to the treatment plans. This also ensured that if this potential scenario is happening, JB would not escape control measures by being just a bit outside of the treatment area.

Are new introductions occurring?

Stable Isotope Analysis

To determine if JB are being newly introduced to the state, the UDAF Insect Program has submitted many specimens for stable isotope analysis in recent years. This technology analyzes isotopes, or differently identifiable versions of the same element, to determine migratory patterns and origins of organisms. By examining isotopes one can determine where something may have originated because isotopes have geographical distinction. Zimmo et al. (2012) cleverly suggested that a simplified way of understanding stable isotope analysis is encapsulated by the old adage "you are what you eat." When an organism eats food that contains geographically-unique isotopes, those elements become part of their body and can be observed and compared. For instance, if a single JB originates in the Southeast of the U.S., it will ingest isotopes in its food that are markedly different than another JB that lives in the Midwest; this difference is measurable with stable isotope testing.

In 2023, a number of JB captured in that same year were sent to the Utah State University (USU) Department of Geosciences for stable isotope testing. Also submitted

were JB captured in Orem during the late aughts. These beetles were submitted as reference specimens that could be used as a comparison to recent captures because they have a high probability of being from Utah. Indeed, the Orem infestation lasted years, and the population at its peak was in the thousands. It is a virtual certainty that the Orem specimens found in later years of the infestation were from Utah. The results provided by USU were surprising: based on their isotope profile, 75% of the 20 specimens submitted from 2023 were almost undoubtedly from another state.

These results inspired the program to conduct another round of testing on 2024 specimens. Roughly 1/3 of the captures in that year representing all three counties were submitted to the USU lab for analysis. Because several specimens from Orem were previously analyzed as control references, no additional beetles of known origin were submitted.

Of the 40 beetles analyzed from 2024, stable isotope analysis results suggest that a staggering 40% are likely to be of out-of-state origin. Furthermore, 100% of these were caught in traps along transportation corridors such as railways (freight and passenger) and major highways. These results strongly support the UDAF Insect Program's hypothesis that beetles are continuously being introduced via these routes.

Conversely, 27.5% of the submitted specimens have hydrogen isotope values very similar to those of the Orem specimens, suggesting high likelihood of Utah origin. An additional 12.5% of the specimens are also likely to be of Utah origin, but with slightly higher isotope values, certainty is somewhat decreased. The origin of the remaining 20% of specimens cannot be reasonably determined without further analysis.

A detailed diagram of how stable isotope analysis works can be found in the 2023 Insect Report.

Conclusion

While it is still too early to tell exactly why the eradication effort is having mixed success, preliminary research on the matter is indicating that the state is likely being re-infested with JB via an unknown transportation corridor. In support of this tentative inference, stable isotope analysis indicates that a large number of JB captured are likely from outside the state and that places where JB populations are persistent are nearly all industrially zoned with little host material and substantial commercial freight traffic. Moreover, soil moisture testing in these industrial areas reveal that the unmanaged environment is generally extremely dry and unsuitable for JB reproduction. Therefore, eradication treatments of managed turf in these areas are likely controlling JB that have been introduced in previous years, but do nothing to stop new individual beetles from showing up; this creates an impression of a stable population, when in actuality, new beetles are being "dropped off" every year.

Plans for 2025

In 2025, the UDAF Insect Program plans to continue eradication work in Wasatch Front areas with JB detections that trigger treatment protocol, set delimiting traps where JB have been discovered in previous years, and place standard detection traps in regions of the state with no past captures. In addition, the program will continue to explore why JB persists in certain areas, despite previous eradication actions. Simultaneously, staff will follow early evidence that JB are being continuously re-introduced, with the ultimate goal of closing previously unidentified introduction pathways, should they exist.

RANGELAND PEST SUPPRESSION PROGRAM

Grasshopper populations have increased in recent years, with outbreaks occurring in several areas throughout Utah. UDAF manages the Utah Rangeland Pests Cost Share Program to help Utah producers mitigate the costs and impacts of grasshoppers (various genera) and Mormon cricket *Anabrus simplex* (Halderman) outbreaks.

The program provides 100% cost-share reimbursement for chemical treatments using the Reduced Agent and Area Treatment (RAATs) method. This method can achieve up to a 95% reduction in pest populations while saving over 50% in cost, chemical use, and time. The UDAF cost share program covers a single treatment, including the chemical and adjuvant, used to suppress grasshopper and Mormon cricket populations on privately owned property. Participants are responsible for application costs and cannot combine the costs of treating other pests into reimbursement.

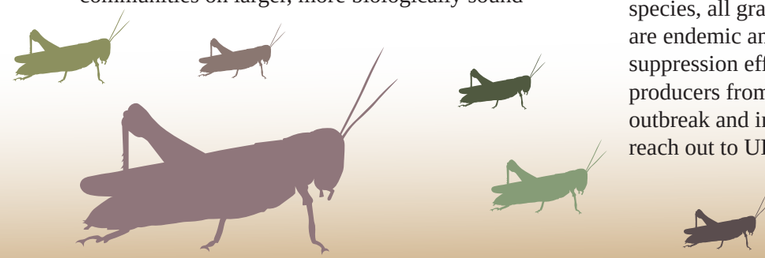
UDAF also provides grasshopper bait to producers for border, buffer, and boundary treatments. This bait is not intended for large-scale applications but rather for suppressing populations migrating from adjacent unmanaged lands or small acre properties. Applicants are eligible for one cost-share reimbursement per year and are encouraged to collaborate with their communities on larger, more biologically sound projects for broader and longer-lasting impact.

Early identification of infestations is crucial, as rangeland pests are most effectively managed during their early growth stages. Many treatment chemicals are less effective on adult pests. Treating only individual properties while adjacent lands remain unmanaged often results in re-infestation. However, coordinated treatments across entire infestation areas can significantly reduce populations for years.

In 2024, the program approved 45 cost-share applications, supporting treatments on 73,156 acres and suppression efforts on 146,312 acres. Additionally, UDAF provided nearly 100 producers with 13 pallets of bait for small-acre suppression efforts.

2024 saw an increase in grasshopper populations, particularly the migratory grasshopper.

Unfortunately, 2024 saw an increase in grasshopper populations, particularly the migratory grasshopper *Melanoplus sanguinipes* (Fabricius), a species known to damage crops and rangeland in the West. Other common species in Utah include the pasture grasshopper *M. confusus* (Scudder), Packard's grasshopper *M. packardii* (Scudder), clearwinged grasshopper *Camnula pellucida* (Scudder), and big-headed grasshopper *Aulocara elliotti* (Thomas). While North America has around 400 grasshopper species, all grasshoppers and Mormon crickets in Utah are endemic and a natural part of the ecosystem. These suppression efforts are in place to protect Utah producers from damaging pest populations during outbreak and infestation years. To participate please reach out to UDAF for more information.



Emerald Ash Borer

"The Green Menace"

Emerald ash borer (EAB), *Agrilus planipennis* Fairmaire, is a highly destructive invasive beetle that infests all species of true ash, AKA those in the *Fraxinus* genus. This includes green and white ash (*F. pennsylvanica* and *F. americana*, respectively), both of which are native to and widely distributed across central and eastern North America. In Utah, two native ash species can be found in the southern part of the state: velvet ash (*F. velutina*) and single-leaf ash (*F. anomala*). Additionally, ornamental ash trees account for a considerable portion of Utah's urban canopy, providing numerous benefits such as shade and improved air quality.

Native to northeastern Asia, EAB was first discovered in Michigan in 2002. The beetle's population spread quickly, establishing in all surrounding states and Canadian provinces. EAB is now present in most eastern states as far west as Colorado with satellite populations in Oregon, having killed millions of ash trees along its invasive march. It's believed that EAB was introduced to the U.S. in wooden packaging materials, a common route by which invasive beetles often disperse across great distances. Other human-mediated routes of dispersal can include the movement of firewood and ash trees.

Tree infestations can be identified by D-shaped exit holes in the bark, canopy die-off, and growth of epicormic shoots. Pulling back the bark to reveal EAB's characteristic S-shaped galleries can also be helpful in identifying presence. Fortunately, EAB has not yet been found in Utah, potentially thanks to stringent quarantines on ash tree importation and firewood movement that limit human-mediated spread.

2024 Survey

The Utah Department of Agriculture and Food (UDAF) collaborates with the Utah Department of Natural Resources (DNR) on an annual statewide EAB trapping survey. Most trapping consists of a green multi-funnel trap that is hoisted into the canopy of high risk or potentially infested ash trees (see Survey in Action! box on next page). However, UDAF expanded the use of a novel double-decker purple sticky panel trap, after a pilot year of trying the traps in 2023. These traps are placed at green waste facilities, where dead trees are aggregated from various places in the surrounding community. This method is akin to waste water surveillance that has become commonplace practice in public health, and it greatly amplifies the reach of survey work. In 2024, UDAF placed eight double-decker traps and 64 multi-funnel traps in the northern part of the state; DNR placed 31 multi-funnel traps in the southern half of the state. In addition, UDAF completed work on nearly a dozen rearing cages that had ash wood materials enclosed. Rearing cages are an alternative method of EAB survey where limbs are collected from concerning ash trees, put into containers and left to allow wood-boring insects to emerge. No EAB were found in any of the traps deployed or rearing cages processed in 2024.

Interagency Collaboration

Western Region EAB Cooperator's Meeting

Because insects do not abide by geographic boundaries, it is often paramount to take a collaborative approach to dealing with invasives. For the third consecutive year, UDAF brought together representatives from nine agencies to discuss updates and approaches to EAB management. Made up of state, federal, and provincial agricultural departments in the Western U.S. as well as one nationwide NGO, the group discussed updates in populations and approaches to regional preparation, monitoring, detection, and treatment. Additionally, Dr. Emma Hudgins of the University of Melbourne shared her published research on recommended prioritization of quarantines and biological control for the management of EAB on U.S. street trees.

Survey In Action! UDAF EMPLOYS MULTIPLE METHODS OF EAB MONITORING

REARING CAGES (clockwise from top)

1) An ash tree with symptoms that resemble EAB infestation has limbs removed
2) Pruned plant parts are put into sealed containers to rear out insects during the summer months
3) At the end of the season, a technician sorts through ash materials to look for emerged insects

TRAPS (left to right from bottom)

1) A green multi-funnel trap hangs mid-canopy in an ash tree
2) A double-decker sticky panel trap is set at a Wasatch Front green waste facility where residents dump dead tree material from within the county

Utah EAB Task Force

A decade ago, UDAF formed the Utah EAB Task Force, a coalition of groups dedicated to protecting the state from EAB. The organization meets annually and includes representatives from government agencies, city forestry programs, and non-profit organizations. In 2024, the group completed an EAB Exclusion and Response Plan, a comprehensive agreement that outlines and guides collective efforts. The plan was years in the making and now serves as a roadmap for both present and future EAB mitigation. The plan assigns each participating organization a specific role in preventing the invasive insect from being introduced into Utah and potential work to do when the pest arrives. With adoption of the plan, Utah will proceed with EAB prevention and response measures in a thoughtful and organized manner.

Surveying Outside the Wasatch Front

While a major concern of EAB introduction into Utah is the health of our urban canopy, conservation of the state's native ash is of great importance. These native ash can be found in pockets across southern Utah. Consequently, many traps placed by UDAF and DNR are set in rural towns, as well as places where native ash live. Also, for the third year in a row, UDAF was granted a National Park Service (NPS) Scientific Research Permit to conduct trapping in Zion National Park. This area is ideal for surveying because of its populations of both native ash species as well as potential movement of out-of-state firewood. With the guidance of UDAF, NPS placed and monitored eight multi-funnel traps throughout the park. No EAB were detected by these interagency efforts.

Plans for 2025

UDAF will continue to maintain a leadership role in EAB exclusion and detection efforts. Nursery inspectors will vigilantly enforce quarantine rules for firewood and ash nursery stock. The survey program will coordinate monitoring efforts and expand green waste facility trapping into new areas of the state. UDAF Insect Program staff will also keep urging citizens to buy or collect firewood locally and encourage cities, landscape managers, and residents to prepare for EAB introduction.

ENTOMOLOGY LAB

CREATED WITHOUT AI

The UDAF Entomology Lab, which shares space with the UDAF Seed Lab in the Taylorsville State Office Building (TSOB), provides supportive services to all of UDAF's regulatory insect activities. The lab keeps an open phone line to help folks with regulatory insect problems (see page 35, Contacts and Resources). Entomology lab staff fields aggressive bee complaints, reports of invasive insect species, and connects stakeholders with resources for nuisance or public health pests. The lab also offers walk-in/mail-in identification services for insects of regulatory concern.

2024 Trapping Samples Processes

The UDAF Entomology Lab provides crucial space and equipment for Insect Program staff to rapidly process trap catches for various regulatory pest surveys in-house (Table 1). Lab technicians sort through all the insects caught in each trap (known as "bycatch") searching for target pests. If found, suspect target pests are then sent via USDA channels to the appropriate taxonomic expert for official specimen determination.

No new insects of regulatory concern were found in 2024

Survey	Samples processed	Number of target detections
Orchard pest sentinel	132 (total)	578 (total)
· *Light brown apple moth*	32	0
· *Apple maggot*	52	58
· *Western cherry fruit fly*	48	520
Imported fire ant	37	0
Emerald ash borer	513	0
European corn borer	6	0
Exotic wood borer	170 (total)	0
· *Ips bark beetles*	85	0
· *Monochamus beetles & large pine weevil*	85	0

Table 1. Regulatory pest survey trap catch samples processed by lab staff in 2024.

Apiary Diagnostics

The UDAF Entomology Lab offers diagnostic services to registered Utah beekeepers for five honey bee maladies (Table 2). Rapid diagnostics are vital to prevent the spread of apiary disease.

In 2024, the median turnaround time for apiary samples was nine days. Consequently, additional staff were trained to perform the apiary testing protocols. This will ensure that beekeepers can rely on the UDAF Entomology Lab for timely results in the future.

The lab experienced an increase in the number of out-of-state submissions in 2024. Apiary diagnostic services are offered to out-of-state individuals for a fee of $40 per sample. This year, 11% of submitted apiary samples were from out-of-state.

220 apiary samples submitted for diagnostics

200 brood swab samples

20 adult bee samples

Test target	Method	Number of tests performed	Percent of results above thresholds
American Foulbrood (AFB) *Paenibacillus larvae*	Molecular qPCR	200	18%
European Foulbrood (EFB) *Melissococcus plutonius*	Molecular qPCR	200	45%
Nosema disease *Vairimorpha* spp. spores	Microscopy	20	15%
Tracheal mite *Acarapis woodi*	Microscopy	14	0%
Varroa mite *Varroa destructor*	Alcohol wash	12	50%

Table 2. Type and number of apiary diagnostic tests performed by lab staff in 2024.

Miscellaneous Insect Work

Bycatch

While processing catches from targeted pest traps, UDAF Entomology Lab staff keep their eyes peeled for any interesting specimens in the bycatch. “Lookalike species” are morphologically similar to target regulatory pests and are particularly valuable. These specimens are often pulled out of the bycatch and added to the lab’s reference insect collection (Figure 1). *Agrilus walsinghami* (Crotch), for example, is a native buprestid beetle with similar morphology to the regulated buprestid emerald ash borer (EAB), *A. planipennis* (Fairmaire), an invasive pest of high priority to the UDAF Insect Program. For more info about EAB, see Emerald Ash Borer “The Green Menace” article (page 23). Maintaining a reference collection of both lookalike and regulated species ensures that current and future staff can quickly identify suspect specimens by cross-referencing suspects with the collection. In 2024, 15 traps contained bycatch specimens that were added to the collection.

Wasp Trapping

A new pest survey was piloted in Utah this year which targeted invasive bee and wasp species. This collaborative multi-state survey is organized by the Pennsylvania Department of Agriculture (PDA) and has been ongoing in Pennsylvania since 2016. Multiple invasive wasp species have been introduced into the U.S. and its territories in recent years, such as the northern giant hornet (NGH) *Vespa mandarinia* (Smith), yellow-legged hornet (YLH) *V. velutina* (Lepeletier), and greater banded hornet (GBH) *V. tropica* (Linnaeus). These invasive wasps pose significant threats to public health and the beekeeping industry. For more information about these species, see Invasive Wasps pest profile (page 34). 2024 is the first year that any active wasp trapping has been performed in Utah. Two sites were selected that were close to state offices. At each site, three types of traps (Figures 2 - 4) were baited with a Hymenoptera-attractant: a solution of sugar, water, and yeast. Traps were checked by UDAF Apiary Program staff every two weeks and catches were sent to taxonomists at PDA for processing. Trap catches are still being processed, and results are expected in the upcoming year. Based on UDAF staff’s preliminary inspection of trap catches (Figure 5), none of the named invasive wasps above were observed. If UDAF continues to participate in this wasp trapping, future trapping sites should be selected based on proximity to transit hubs such as airports and railyards.

Figure 1. Native buprestid (left) invasive buprestid (right)
Figures 2. - 4. Invasive wasp traps
Figure 5. Insect bycatch


1


2


3


4


5

INVASIVE PEST PROFILES

Using state and federal funding, UDAF surveys for numerous exotic pests

Spongy Moth

***Lymantria dispar* Linnaeus**

Forest defoliating pest

2,125 TRAPS PLACED IN 29 COUNTIES | FUNDED BY UDAF & USDA APHIS

Spongy moth (SM) is an invasive pest of hardwood trees. Originally from Europe, this pest can severely defoliate more than 300 different host plants. SM females often lay their eggs on outdoor household items such as grills, trailers, and toys, making new introductions around the country likely. While SM has been a familiar pest of Northeastern and Midwestern forests for decades, it was only detected for the first time in Utah in the 1980s. Utah successfully eradicated two populations, first in the late 1980s and again in the mid-1990s. Extensive surveying since then has detected a handful of moths, but continued multi-year trapping efforts have revealed no more detections.

Utah status: Not known to be present
Native range: Europe
Infested areas: 20 Northern, Midwestern, and Southern states &Washington D.C.

Imported Fire Ants

***Solenopsis invicta* Buren & *S. richteri* Buren**

Human, livestock & agriculture pest

77 TRAPS PLACED IN THREE COUNTIES | FUNDED BY USDA APHIS

Commonly known as red and black imported fire ants, these South America-natives affect a wide variety of industries and aspects of life. Agriculturally, they are well-known corn, fruit tree, and livestock pests. They also commonly interact with humans as they are known to be aggressive, form giant mounds in golf courses and parks, interfere with telecommunication and electrical infrastructure, and even damage airport runway infrastructure. Most of Utah is not considered habitatable for these invasive ants; however, the southern Utah counties of Kane and Washington are expected to be suitable. This pest has not been detected during surveys of these areas.

Utah status: Not known to be present
Native range: South America
Infested areas: 11 Southern states, parts of California, New Mexico and Puerto Rico

Plum Curculio

***Conotrachelus nenuphar* (Herbst)**

Orchard fruit pest

13 TRAPS PLACED IN THREE COUNTIES | FUNDED BY UDAF

Plum curculio (PC) is a destructive species of weevil native to the Eastern U.S. This pest is considered one of the oldest known fruit crop pests in the U.S. with observations dating back to the early 1700s. PC has a wide host range including apple, peach, cherry, and pear, and in some regions has been observed utilizing blueberry and grape. Despite its lengthy history, few control methods have been determined for the successful management of PC, with top-down insecticide applications remaining as the primary approach. In 1983, the weevil was found in Box Elder County, Utah and remains the only place in the western U.S. with a known PC population. The weevil has not been found in any other surveyed Utah counties.

Utah status: Present
Native range: Eastern U.S.
Infested areas: Box Elder County, Utah.

Apple Maggot

***Rhagoletis pomonella* (Walsh)**

Orchard fruit pest

11 TRAPS PLACED IN THREE COUNTIES | FUNDED BY UDAF

Apple maggot (AM) is a species of fruit fly native to the Eastern U.S. The spread of this pest to the non-native Western U.S. is believed to be due to the movement of contaminated apples. As the name suggests, AM primarily uses apples as their host; however, AM also attacks other pome fruits such as pear, stone fruits such as plum, and hawthorn. AM larvae (maggots), the most destructive life stage, can often be distinguished from other pests due to its tendency to feed on the fruit's flesh versus the core. AM is present in Utah. In 2024, a total of 58 AM were found across eight orchards.

Utah status: Present
Native range: Northeastern U.S.
Infested areas: Most of the continental U.S.

Western Cherry Fruit Fly

***Rhagoletis indifferens* Curran**

Orchard fruit pest

13 TRAPS PLACED IN THREE COUNTIES | FUNDED BY UDAF

Western cherry fruit fly (WCFF) is a serious pest of sweet and tart cherries in Utah. Closely related to the apple maggot, WCFF is native to the Western U.S. WCFF maggots feed on the cherry flesh before developing and eventually emerging. This process leaves an exit hole and "wormy" leftover fruit that is unmarketable. Infestations within an orchard can be spotty but spread rapidly if left unchecked; therefore, this pest is heavily managed by individual orchards using chemical baits and insecticides and various cultural methods. Of all orchards surveyed for WCFF in 2024, 83% had at least one detection of this pest. A total of 520 were found statewide.

Utah status: Present
Native range: Western U.S.
Infested areas: Western U.S.

Light Brown Apple Moth

***Epiphyas postvittana* (Walker)**

Orchard fruit pest

10 TRAPS PLACED IN TWO COUNTIES | FUNDED BY UDAF

Light brown apple moth (LBAM) is a species of leafroller moth native to Australia. A major pest of pome fruits and ornamental plants in its larval form, this insect has spread through various parts of the world over the last century such as Great Britain, New Zealand, and the U.S. state of Hawaii. This range expansion includes the state of California, in which it was discovered in 2007. These persistent populations on the West coast are closely monitored, as further range expansion in the continental U.S. could pose a large agricultural risk. LBAM has not yet been detected in Utah.

Utah status: Not known to be present
Native range: Australia
Infested areas: California

European Corn Borer

***Ostrinia nubilalis* (Hübner)**

Vegetable & ornamental pest

74 TRAPS PLACED IN 17 COUNTIES | FUNDED BY UDAF

European corn borer (ECB) is an invasive snout moth native to Europe. ECB was first discovered in the U.S. in 1917, and populations are now established in most Eastern and several Western states. Likely due to multiple introductions of different geographical origins, several subspecies are believed to exist in U.S. populations. ECB larvae (caterpillars) can severely damage corn crops, however ECB utilizes a wide range of crops, including peppers and potatoes. To limit the establishment of ECB in Utah, the state enacted a quarantine in 1987 which requires official certification for the importation of several host crops from locations known to have ECB. Likely thanks to this quarantine, Utah has remained free of this pest.

Utah status: Not known to be present
Native range: Europe
Infested areas: Most corn-growing states east of the Rocky Mountains

Asian Longhorned Beetle

***Anoplophora glabripennis* (Motschulsky)**

Exotic wood borer

25 VISUAL SURVEYS ACROSS SEVEN COUNTIES | FUNDED BY USDA APHIS

Asian long-horned beetle (ALB) is a large, conspicuous pest of many hardwood species not limited to oak, maple, and stone and pome fruit trees. Considered a serious pest in its native Asian range, ALB was first discovered in the U.S. state of New York in 1996, and further investigation found severe tree damage and additional nearby populations. As of 2024, eradication efforts are underway in New York, Massachusetts, Ohio, and South Carolina. While the U.S. introduction of ALB is believed to be due to infested wooden packaging materials, wood-boring pests can also be transported inside firewood, so people are advised to avoid moving firewood over state borders (see UAC § R68-23).

Utah status: Not known to be present
Native range: Asia
Infested areas: Found in Massachusetts, New York, Ohio & South Carolina (eradication in progress)

Citrus Longhorned Beetle

***Anoplophora chinensis* (Forster)**

Exotic wood borer

25 VISUAL SURVEYS ACROSS SEVEN COUNTIES | FUNDED BY USDA APHIS

Citrus long-horned beetle (CLB) is primarily native to east Asian countries such as China, where it is known to be a serious pest of citrus. The first U.S. interception of CLB was made on a bonsai tree shipment in Georgia in 1999. However, in 2002, it was discovered that CLB had escaped from imported nursery stock in Tukwila, Washington. This immediately prompted eradication efforts, and success was declared in 2006 after no new detections had been made for several years. Novel introductions of CLB are most likely to occur on live hardwood tree stock of many species such as maple, stone fruits, ash, and walnut. As of now, CLB is not known to be present in the U.S.

Utah status: Not known to be present
Native range: Asia
Infested areas: Not known to be in the U.S.

Japanese Pine Sawyer

***Monochamus alternatus* Hope**

Exotic wood borer

25 TRAPS PLACED IN SEVEN COUNTIES | FUNDED BY USDA APHIS

Japanese pine sawyer (JPS) is a potentially destructive invasive beetle native to east Asia. JPS has been reported feeding on several pine, spruce, and fir species. Unlike many other wood-borers, feeding by JPS is not what primarily causes damage to the host tree; rather, JPS can vector a pine-killing species of pathogenic nematode, *Bursaphelenchus xylophilus*. Once the tree is infected by the nematode, it can then contract the often-deadly pine wilt disease. This pest has not yet been detected in the U.S.

Utah status: Not known to be present
Native range: Asia
Infested areas: Not known to be in the U.S.

Black Fir Sawyer

***Monochamus urussovii* (Fisher von Waldheim)**

Exotic wood borer

25 TRAPS PLACED IN SEVEN COUNTIES | FUNDED BY USDA APHIS

Black fir sawyer (BFS) is an invasive beetle native to Eurasia. This pest is often found in stands weakened by fire and drought, where it may attack all species in the pine family (Pinaceae) but causes particular damage to fir species. Damage from BFS often occurs from branch feeding, during which the beetle may infect the branches with a blue-stain fungus, further decreasing tree health. Beetle oviposition and feeding may then lead to tree decline and mortality. This species is not currently established in the U.S.

Utah status: Not known to be present
Native range: Eurasia
Infested areas: Not known to be in the U.S.

European Spruce Bark Beetle

***Ips typographus* (Linnaeus)**

Exotic wood borer

25 TRAPS PLACED IN SEVEN COUNTIES | FUNDED BY USDA APHIS

European spruce bark beetle (ESBB) is a destructive pest of pine, spruce, and fir trees that has caused extensive declines in forest health in Europe. Not only does feeding by ESBB often lead to tree mortality on its own, this pest can also carry blue stain fungus. This fungus hinders water transportation and leaves blue streaks in the wood, destroying commercial value. These coniferous trees make up a large proportion of the trees in Utah's national forests and support watershed and habitat quality. Despite interceptions at the ports, this species has not yet established in the U.S.

Utah status: Not known to be present
Native range: Europe
Infested areas: Not known to be in the U.S.

Six-toothed Bark Beetle

***Ips sexdentatus* (Börner)**

Exotic wood borer

25 TRAPS PLACED IN SEVEN COUNTIES | FUNDED BY USDA APHIS

Six-toothed bark beetle (STBB) is considered a secondary pest of pine trees. Secondary pests typically arrive following other disturbances, such as wildfires, which may prematurely damage the tree. Additionally, bark beetles release chemicals while feeding that attract other beetles to the area to utilize the weakened trees, increasing the outbreak severity. In conjunction with other bark beetle species, STBB has the potential to cause severe damage to Utah's forest health. This pest has not yet been found in the U.S.

Utah status: Not known to be present
Native range: Europe
Infested areas: Not known to be in the U.S.

Large Pine Weevil

***Hylobius abietis* (Linnaeus)**

Exotic wood borer

25 TRAPS PLACED IN SEVEN COUNTIES | FUNDED BY USDA APHIS

Large pine weevil (LPW) is a significant pest in European plantation forestry likely native to much of Asia. In commercial plantation settings, LPW will mate in stumps and roots of felled conifers, then as adults begin feeding in the tree's roots, stem, and crown. Feeding can lead to girdling and tree mortality. LPW is particularly destructive to young pines and spruces. Additionally, feeding may cause a chemical release from the tree meant to attract emerging beetles to new hosts. LPW has not yet been found in the U.S.

Utah status: Not known to be present
Native range: Asia
Infested areas: Not known to be in the U.S.

Invasive Wasps & Hornets

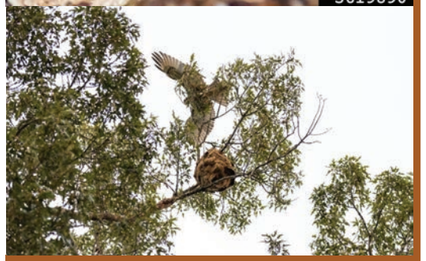
***Vespa* spp.**

Human & apiary pest

6 TRAPS PLACED IN 1 COUNTY | FUNDED BY UDAF & PENNSYLVANIA DEPARTMENT OF AGRICULTURE

Multiple species of invasive wasps have been introduced to the U.S. in recent years, with varying levels of eradication success. For example, the northern giant hornet (NGH), *Vespa mandarinia* Smith, was found in Washington state in 2019. Tremendous effort and resources were spent by USDA-APHIS and the Washington State Department of Agriculture to eradicate the hornet in subsequent years. As of December 18th, 2024, NGH has officially been declared eradicated in the U.S. Meanwhile, eradication of the recently introduced yellow-legged hornet (YLH), *Vespa velutina* Lepeletier, in Georgia and South Carolina is ongoing. The greater banded hornet (GBH), *Vespa tropica* Linnaeus, is an invasive species in the U.S. territory of Guam. All three of these hornet species pose a significant threat to honey bee colonies as they are voracious bee predators. GBH, for example, has killed 12% of honey bee colonies in Guam since its introduction. NGH is known to "slaughter" entire honey bee colonies in a matter of hours. YLH has been observed attacking honey bee colonies during the late summer season, and may predate on other social bee or wasp species.

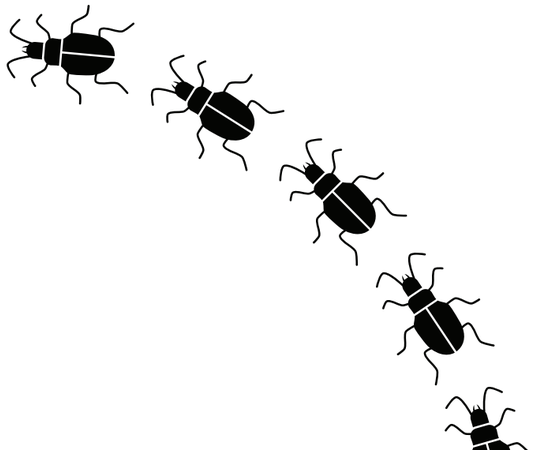
Until this year, UDAF has relied solely on the public to report sightings of suspect invasive hornets. 2024 was the first year that any invasive hornet trapping was performed in Utah. For more information about invasive wasp trapping in Utah, see Entomology Lab, Miscellaneous Insect Work (page 28).



Utah status: Not known to be present
Native range: Asia
Infested areas: Invasive in Europe, currently present in Guam, Georgia, and South Carolina (eradication in progress)

Top images, top to bottom: NGH nest showing multiple life stages, YLH nest in treetop as an eagle soars overhead.

Left to right: yellow legged hornet (YLH), greater banded hornet (GBH), northern giant hornet (NGH) queen and worker. Images not to scale.



To report a suspect invasive insect, email a picture to udaf-insects@utah.gov

Contacts & Resources

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2024 Insect Program Staff & Seasonal Crew

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Gabe Stroup, JB/SM Trapper | Sydney Hickam, JB/SM Trapper | Gabe Brown, EAB/EWB Trapper | Jenna Crowder, Compliance Specialist | Joey Caputo, Compliance Specialist, Carly Zielinski, GIS Analyst | Liz Rideout, Compliance Specialist

Back Row (left to right)

Sharon Gilbert, Lead Trapper | Lauryn Dupaix, JB/SM Trapper | Kristopher Watson, State Entomologist | J.P. Schlegel, JB/SM Trapper | Vin Vasive, Invasive Pest Extraordinaire | Alan Lindsay, JB/SM Trapper | Diana Dilsaver, JB/SM Trapper | Cassie Leavitt-Lytle, JB/SM Trapper

Not pictured

Moss Yeager, JB/SM Trapper

Apiary Resources

UDAF Apiary Program: ag.utah.gov/farmers/plants-industry/apiary-inspection-and-beekeeping/
UDAF Pollinator Habitat Improvement Project: ag.utah.gov/farmers/conservation-division/pollinator-program/
USDA-ARS Pollinating Insect-Biology, Management, Systematics Research:
ars.usda.gov/pacific-west-area/logan-ut/pollinating-insect-biology-management-systematics-research
Project Apis m: projectapism.org

Invasive Insect Resources

Japanese Beetle Eradication
ag.utah.gov/jberadication
USDA-APHIS-PPQ
aphis.usda.gov/aphis/ourfocus/planthealth
Utah Cooperative Agricultural Pest Survey Program
utahpests.usu.edu/caps/utah-caps-program
Utah Plant Pests Diagnostic Laboratory
utahpests.usu.edu/uppdl

Professional Organizations

Apiary Inspectors of America
apiaryinspectors.org
National Plant Board
nationalplantboard.org
National Grasshopper Management Board
sites.google.com/site/ngmborg/home
Utah Horticulture Association
utahhort.org/
Utah Nursery and Landscape Association
utahgreen.org
Utah Beekeepers Association
uba.wildapricot.org

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